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Identification Validity Early Detection of Child Development Using Indonesian Mch Handbook

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ABSTRACT

Children are inevitably essential parts of Indonesian population. Prevalence of children developmental disorders in Indonesia is still pretty high, ranging from 10-18%. In fact, approximately 70% of children with developmental delays are detected without screening. Surabaya is the city with the largest number of Early Childhood Education (PAUD) institutions in East Java, Indonesia. Ministry of Health publish the latest Maternal and Child Health (MCH) Handbook containing a child development checklist. Thus, the purpose of this study is to examine the validity of MCH Handbook as a measuring tool for early detection of child development with Indonesian Pre-Screening Developmental Questionnaire (KPSP) as a gold standard among Early Childhood Education students in Surabaya city. This research was a cross sectional study using diagnostic test design. The population of the study were the children aged 3-72 months in Surabaya city. The sample were selected using multistage cluster random sampling technique, totaling of 400 children. The data were analyzed using Mc. Nemar statistic tests and Kappa Agreement tests. The results showed that there is no difference in the value of development between MCH Handbook and KPSP (p = 1,000). The MCH Handbook was valid with the sensitivity value of 84.5%; specificity value of 96.9% and has a consistency rate of 81.9%. Thus, we can conclude that MCH Handbook is said to be a valid early detection tool for children aged 3 months to 72 months with high agreement value and high sensitivity and specificity. It suggested to health workers to promote the importance of MCH Handbook utilization through social media and Primary Health Care.

Keywords: *Child Development, MCH Handbook, Validity*

Introduction

Indonesia is one of the countries which has the highest number of population in the world. The number of toddlers accounts for 10% of the total population in Indonesia.[1] In 2015, Ministry of Health issued special regulations for health and non-health workers to monitor child growth, including monitoring of gross motor movement, fine motor movement, socialization and independence, as well as speech and language abilities. The child growth monitoring is to perform regularly from children aged 3 months to 72 months. Children with good growth and development in accordance to the age stage are expected to become healthy and productive adults as the state asset, both socially and economically.[1,2]

The world's developmental delay rate is around 10% .[3] In recent years, there has been about 12-16% in the United States, 24% in Thailand, 22% in Argentina and 13-18% in Indonesia. Surabaya is the city with the highest number of Early Chilhood Education in Indonesia. All of them have a risk of developing developmental delay[2,3].

The coverage of each Primary Health Service on children under five in Surabaya has decreased since 2015 from 83.58% to 82.54% in 2016. It is in contrast to the fact that in 2010 Ministry of Health expected that 90% of children under five and preschool children be covered by early detection activities[1]. The unsuccessful attempt on periodic developmental screening is attributed to lack of cross-sector coordination, funding, the provision of Educational Game Equipment (APE) and the stabilization of commitments to implement policies on Stimulation, Detection and Early Intervention of Child Growth and Development (SDIDTK)[4].

Most child development disorders are unnoticed at preschool age. In fact, approximately 70% of children with developmental delays are detected without screening[4]. This is due to the absence of obvious symptoms of child development disorders if there is no screening in accordance to standardized instruments. A good screening tool must have the validity, reliability, sensitivity, specificity and suitability to local conditions. To know the quality of the instrument, it is required to test the validity and reliability, while to test the specificity and sensitivity, it is necessary to test the comparison of measuring instruments with gold standard[5,6].

In 2015, the government published the latest Maternal Child Health/ MCH Handbook containing a child development checklist. Previously, in 2013 the government issued an Indonesian Pre-Screening Developmental Questionnaire (KPSP). KPSP should only be used by health workers[1,2]. To asses KPSP, someone requires special skills, unlike the MCH Handbook which can be read and used by parents as the first known child. Parents can utilize MCH Handbook as a stimulation guide and for monitoring child development. Hence, this study aims to identify the validity of MCH Handbook as a measuring tool of early detection of child development in Indonesia.

Materials and Method

This is a cross-sectional study with diagnostic test design. The study was conducted in Surabaya City from March to May 2018. Research respondents were 400 PAUD children aged 3 months to 72 months obtained by multistage cluster random sampling technique.

Primary data was collected by examining the child's development status using KPSP and MCH Handbook. The KPSP measurement tool is a translation of the Indonesian version of Pre-screening Developmental Questionnaire (PDQ) which contains 10 questions about the child's developmental skills, which parents must answer with yes and no answers, which only takes 10-15 minutes. In this study if the answer 'Yes' less than 9 suspected the problem (suspect), if the answer '' Yes '' 9-10 is considered no problem (normal). While based on MCH Handbook, children are normal if not able to answer a maximum of 1 question posed.

Diagnostic tests are carried out by researchers to obtain the sensitivity and specificity of the MCH Handbook. Processing techniques and data analysis using a computer with statistical program and Mc test. Nemar and Kappa's Agreement.

Findings

Table 1 shows that the distribution of child respondents by sex is approximately the same between women (50.8%) and men (49.2%). The most frequently age that encountered during developmental examination was 72 months (25.3%) while at least was 9 months (0.5%). The children age 72-months were easy to find at the educational level such as Kindergarten.

Table 1 shows that the majority of maternal respondents are mature and productive is about 60.8% (age 25-35 years). In terms of education level, the majority of mothers have a fairly high level of education (83.5%). When viewed in terms of employment, the majority of mothers choose to work at home (54%). The choice of mothers to work at home does not indicate a low level of family income. This condition is indicated by 69.5% of families fulfilled in accordance with the Regional Minimum Wage (UMR) in force in Surabaya.

Table 1: Characteristic of Respondents

Characteristis	n	%
Sex		
Male	197	49,2
Female	203	50,8
Age (months)		
3 months	4	1,0
6 months	3	0,8
9 months	2	0,5
12 months	7	1,8
15 months	4	1,0
18 months	4	1,0
21 months	6	1,5
24 months	8	2,0
30 months	19	4,8
36 months	23	5,8
42 months	32	8,0
48 months	38	9,5
54 months	36	9,0
60 months	62	15,5
66 months	51	12,8
72 months	101	25,3

Conted…

Mother's age (years)		
15-25	28	7,0
26-35	243	60,8
36-45	124	31,0
46-55	5	1,3
Mother's Education		
Primary Education	20	5,0
Secondary Education	46	11,5
Tertiary Education	334	83,5
Mother's Occupation		
Housewife	216	54,0
Others	184	46,0
Family Income		
< Regional Minimum Wage	278	69,5
≥ Regional Minimum Wage	122	30,5
Number of children		
≤ 2 persons	281	70,3
> 2 persons	119	29,7
MCH Handbook Utilization		
Never exploit	67	16,8
Just read	42	10,5
Read and filled	291	72,7
Frequency of Posyandu Visit		
Routine every moth	233	58,3
2-5 times a year	103	25,8
Never	64	16,0

Based on Table 1, some mothers have 1-2 children (70.3%). The majority of mothers' use MCH Handbook (72.7%). This is supported by regular visits to Posyandu (58.3%) every month.

Table 2 shows that the majority of children are normal based on KPSP (82.3%) and MCH Handbook (82.5%). The prevalence suspicion of developmental disturbance is 17.8% based on KPSP and 17.5% based on MCH Handbook. The sensitivity value of MCH Handbook is 84.5% while the specificity is 96.9%. Positive Predictive Value (PPV) calculation is high, 85.7% with Negative Predictive Value (NPV) which is also high (96.6%).

Mc. Nemar test is used to compare MCH Handbook with gold standard (KPSP). Table 3 shows that there is no difference in the results of the examinations of the two measuring devices (sig = 1,000; p-value> 0.05). This is indicating that the MCH Handbook can be used to assess the child's developmental status at home.

From the analysis results in table 3, we can know that the measuring tool MCH Handbook declared valid in measuring the child's development status. To see how much the consistency of MCH Handbook assessment, Kappa's Agreement coefficient test was performed. Table 4 shows the agreement between the two measuring devices (sig = 0,000; p value <0.05). The level of agreement on the results of the examination between the two measuring instruments is high (81.9%).

Discussion

Validity of measuring instrument test is defined as the ability of a measuring instrument to distinguish who is sick and not sick. Then this validity can be assessed with sensitivity and specificity. Based on the results of the study, the sensitivity of the MCH Handbook is seen from its ability to correctly identify children who are suspected of deviation in their development. Determination of false positive and negative will impact on health services provided[7].

Tabel 2: Developmental status based on MCH Handbook and KPSP

Developmental Status		Indonesian PDQ (KPSP)				TOTAL	
		Suspect		Normal			
		n	%	n	%	n	%
MCH Handbook	Suspect	60	15,0	10	2,5	70	17,5
	Normal	11	2,8	319	79,8	330	82,5
TOTAL		71	17,8	329	82,3	400	100,0

Sensitivity 60/60 + 11 = 84, 5%; PPV = 60/60 + 10 = 85, 7%;

Spesivisity 319/319 + 10 = 96, 9%; NPV = 319/319 + 11 = 96, 6%

Tabel 3: Result of Mc. Nemar analysis

Variable	Gold Standard	p-value	Information
MCH Handbook	Indonesian PDQ (KPSP)	1,000	There is no difference developmental status (valid)

Tabel 4: Result of Kappa's Agreement analysis

Variable	Gold Standard	p-value	Kappa's Agreement
MCH Handbook	Indonesian PDQ (KPSP)	0,000	81,9%

Calculation of sensitivity value of measuring tool MCH Handbook classified as high (84,5%). This means that measurements using the MCH Handbook can represent 84.5% of cases of developmental suspicion correctly based on the gold standard. This is because the details of the questions in the MCH Handbook can represent the child's development status before further diagnosis was made. Each of the details asked has included four aspects of development as set forth in the guidance of SDIDTK[1].

In Korea, Hyo Yun (2011) conducted a study on 226 children by comparing measurements issued in his country, Korean-Ages and Stages Questionnaire (K-ASQ) with Denver II. The result said that sensitivity of 76.3-90.2% was high. Based on the results of the study K-ASQ is feasible to be used to detect the child's development status in Korean territory[8].

The results of the study from Glascoe and Bryne (1992) concluded the same thing. According to him, the sensitivity value generated from Denver II is high at 83%. The study was conducted in 104 children ages 3 months to 72 months in five child care centers. Accurate screening will contribute to the necessary early intervention measures in children with suspected developmental impairment. Research in the Arab region conducted by Ansari and Bella (1998) revealed that the developmental pre-screening tool adopted from the DDST revision showed high sensitivity. Adoption is done by translating the points of development aspects that are asked in accordance with the ethnic and cultural conditions in Arabia[8,9]

Dhamayanti (2006) from Bandung city, Indonesia less agree with the results of research. The sensitivity of the measuring instrument is moderate 60%. This is because the use of tools is not worth it. Similarly, Kadi (2008) who studied 85 children aged 12-14 months with a history of Low Birth Weight (LBW) in Bandung for one month in February to March 2008. The result said that sensitivity of the measuring instrument by 63% [10,11].

Calculation of specificity value of MCH Handbook measuring instrument is high (96,9%). This is due to the details of the question to assess the child's development in the MCH Handbook according to the general condition of the child in the field so that the child is able to perform and execute the instruction easily. In addition, more or less questions asked have been based on the KPSP so that the details of the question difference are not too great. The results are supported by research of Artha (2014) on 133 toddlers aged 6-60 months in Yogyakarta, Indonesia[10,11,12].

The result of research proves that MCH Handbook measuring instrument is valid with high agreement level (81,9%). The value of this high agreement is supported by the result of the assessment of normal child development status resulting from KPSP and MCH Handbook also tend to be the same i.e. 82.3% and 82.5%. The advantages of this study shows that this research was conducted on general population of children under five years' age range 3 months to 72 months, not limited to toddlers with high risk factors such as some previous research. The selection of such research subjects is more appropriate in the context of the use of both devices as a means of screening. In addition, the location of the study does not lie in slum areas that are prone to experience developmental delays due to lack of stimulation. Field observations show the items that the MCH Handbook asks are likely to be easily answered or can be done by normal children in general, so the agreement obtained tends to be high[10,11,12].

The value of the agreement of a high measuring instrument is supported by Artha, et al (2014). Furthermore, research conducted in the Tehran region by Shahshahani, et al (2010) states that the Persia version of the developmental expedition screening guidelines adopted from Denver II has good validity and reliability in detecting child development status when compared with Ages and Stages Questionnaire (ASQ). The study

was then followed up by Kazemnejad (2011) in Tehran in children aged 4-60 months. However, Marjolaine et al (2011) in his research area indicated that the agreement between ASQ and Denver II was high when compared with PEDS[12,13,14].

The results of the research in the field was less agree with Kadi (2008) which resulted in the value of a moderate agreement. This is due to the different research area conditions, the number of different research subjects and the tools used are also different. His study was conducted in one place and at one age point, thus less reflecting equality at other ages[11].

The disagreement on the results of the examination between commonly used screening tools further indicates the importance of good development surveillance processes. The role of clinician with experience and clinical skills becomes important to capture children who are likely or at risk of developing disorders. Some of the existing screening tools should be used with a good understanding of their respective advantages and disadvantages. Selection of any device should consider the things combined with the suitability of the existing clinical setting.

Conclusion

The MCH Handbook was valid as an early detection tool for children aged 3 months to 72 months with high agreement value (81.9%) and high specificity sensitivity (84.5% and 96.9%). Most children were normal according to KPSP (82.3%) and MCH Handbook (82.5%). It is recommended for health workers to promote the importance of utilizing MCH Handbook through social media and Primary Health Care.

Conflict of Interest: There is no conflict of interest in the study

Ethical Clearance: The study was received ethical approval from the Health Research Ethics Committee, Faculty of Public Health, Airlangga University.

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